

Remarks

The Applicant respectfully requests reconsideration of this application in view of the following remarks. In this response, claims 1-9 have been cancelled, without prejudice and thirteen new claims, i.e., claims 10-22, have been added. Hence, upon entry of this amendment, claims 10-22 are presented for examination.

New Title

A proposed amendment to the title is included herein to make it more specific and technically accurate with respect to the newly presented claims. The Examiner's review and approval of the proposed new title is respectfully requested.

Claim Rejections – 35 U.S.C. §112

In the Office action, the Examiner rejected claims 1-9 under 35 U.S.C. §112, second paragraph, for purportedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention as a result of use of functional language, such as the phrase "virtual router." The undersigned respectfully disagrees with the Examiner's conclusion that the claims are indefinite and respectfully requests the 35 U.S.C. §112, second paragraph, rejections be withdrawn in view of the remarks provided below and the more detailed nature of the new claims.

It is well settled that "[t]here is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper." (See MPEP §2173.05(g) citing In re Swinehart, 439 F.2d 210, 169 USPQ 226 (CCPA 1971)). MPEP §2173.05(g) further requires that "[a] functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used."

The phrase "virtual router" has a well-known meaning in the networking field as illustrated by RFC 4026, an Internet-Draft entitled "Network based IP VPN Architecture Using Virtual Routers" (copies of which are provided concurrently herewith as part of an Information Disclosure Statement) and the above-referenced patent application as filed (see, e.g., specification at pg. 8). Definitions of "virtual router" are

provided in paragraph 8.12 of RFC 4026 and in paragraph 4 of the Internet-Draft. In view of the foregoing, it is respectfully submitted that in the context of the pending claims, the breadth and scope of the phrase “virtual router” is readily ascertainable by those of ordinary skill in the pertinent art.

Claim Rejections – 35 U.S.C. §101

In the Office action, the Examiner rejected claims 1-6 under 35 U.S.C. §101 for purportedly being directed to non-statutory subject matter as a result of “virtual routers” being considered “software, per se.” Without addressing the validity of the Examiner’s non-statutory subject matter rejection, the undersigned simply points out the newly added claims are method claims rather than system claims, to which the prior non-statutory subject matter was directed.

Claim Rejections – 35 U.S.C. §102 US Patent No. 6,609,153 of Salkewicz

In the Office action, the Examiner rejected claims 1-9 under 35 U.S.C. §102(e) for allegedly being anticipated by US Patent No. 6,609,153 of Salkewicz (hereafter “Salkewicz”). The undersigned respectfully disagrees with the Examiner’s characterization of the teachings and/or applicability of Salkewicz to the claims and points out below distinctions between the claimed subject matter and the teachings of Salkewicz.

Briefly and by way of background, various embodiments of the present invention involve the use of a network operating system (NOS) executing on each of a plurality of processor elements of a virtual router (VR)-based switch. The NOS supports the creation of discrete customized services for multiple subscribers of a service provider operating the switch by providing each subscriber with a customized configuration of service object groups. In general and without reference to any specific claim, in one embodiment, VRs the VR-based switch are allocated to the subscribers. The subscriber VRs are configured with an appropriate service object group based on the service needs of the subscriber. In order to achieve the desired level of computational support for the services being provided, the objects of the service object group can be dynamically

distributed by the network operating system of the VR-based switch among processors associated with the processing elements to which the VRs are mapped.

As presently understood by the undersigned, Salkewicz generally relates to methods and systems for elimination of complicated inter-domain policies by way of virtual network machines having separate and independent network domain databases. **Salkewicz is not understood to address enhancements or improvements in relation to implementing customized managed network services.**

Regarding new independent claim 10, Salkewicz does not teach or reasonably suggest the expressly required configuration of two different sets of customized services, including a plurality of firewalling, virtual private networking, encryption, traffic shaping, routing and NAT, within a VR-based switch for two different subscribers “by allocating a first service object group within the first plurality of VRs, the first service object group including a service object corresponding to each service of the first set of customized services and wherein each service object of the first service object group can be dynamically distributed by the NOS to customized processors of the first set of one or more of the plurality of processing elements to achieve desired computational support” and “by allocating a second service object group within the second plurality of VRs, the second service object group including a service object corresponding to each service of the second set of customized services and wherein each service object of the second service object group can be dynamically distributed by the NOS to customized processors of the second set of one or more of the plurality of processing elements to achieve desired computational support.” For at least these reasons, independent claim 10 and its dependent claims, which add further limitations, are thought to be patentably distinguishable over Salkewicz.

Regarding new dependent claims 12 and 13, Salkewicz does not teach or reasonably suggest that a VR can span multiple processing elements as required. Rather, the individual VRs of Salkewicz appear to be limited to using the resources of a single processing element. For at least this additional reason, dependent claims 12 and 13 are thought to be further distinguishable over the teachings of Salkewicz.

Regarding new dependent claims 14 and 15, Salkewicz does not teach or reasonably suggest defining a configured topology among a plurality of VRs as required

by configuring VIs of the plurality of VRs to provide desired paths for packet flows and permissible transformations of the packet flows. For at least this additional reason, dependent claims 14 and 15 are thought to be further distinguishable over the teachings of Salkewicz.

Regarding new dependent claim 16, Salkewicz does not teach or reasonably suggest a processing element may be shared by two VRs as recited. For at least this additional reason, dependent claim 16 is thought to be further distinguishable over the teachings of Salkewicz.

Regarding new dependent claim 17, Salkewicz does not teach or reasonably suggest a maintaining a replicated forwarding information base as recited. For at least this additional reason, dependent claim 17 is thought to be further distinguishable over the teachings of Salkewicz.

Regarding new claims 18-22, they include limitations similar to those described with reference to new claims 10-17. Consequently, claims 18-22 are thought to be allowable over Salkewicz for the same reasons presented with reference to new claims 10-17.

Claim Rejections – 35 U.S.C. §102
US Patent No. 6,674,756 of Rao et al.

In the Office action, the Examiner rejected claims 1-9 under 35 U.S.C. §102(e) for allegedly being anticipated by US Patent No. 6,674,756 of Rao et al. (hereafter “Rao”). The undersigned respectfully disagrees with the Examiner’s characterization of the teachings and/or applicability of Rao to the claims and points out distinctions between the claimed subject matter and the teachings of Rao.

As presently understood by the undersigned, Rao generally relates to a physical network switch that may be partitioned into multiple virtual routers among which ISDN or modem resources are allocated to support dial network wholesaling and accommodate the increase in the volume and variety of network traffic. Rao is not understood to address enhancements or improvements in relation to implementing customized managed network services.

Regarding new independent claim 10, it has been presented herein with sufficient detail to clarify the particular mechanisms and steps through which discrete customized services are provided to multiple subscribers of a service provider operating a VR-based switch performing the recited method. For example, claim 10 makes it clear that a network operating system (NOS) is provided on each of a plurality of processing elements of the VR-based switch and that two different sets of customized services, including a plurality of firewalling, virtual private networking, encryption, traffic shaping, routing and NAT, within the VR-based switch “by allocating a first service object group within the first plurality of VRs, the first service object group including a service object corresponding to each service of the first set of customized services and wherein each service object of the first service object group can be dynamically distributed by the NOS to customized processors of the first set of one or more of the plurality of processing elements to achieve desired computational support” and “by allocating a second service object group within the second plurality of VRs, the second service object group including a service object corresponding to each service of the second set of customized services and wherein each service object of the second service object group can be dynamically distributed by the NOS to customized processors of the second set of one or more of the plurality of processing elements to achieve desired computational support.” The provision of discrete customized services to multiple subscribers of a service provider, support for same by a NOS, the allocation of service object groups and the capability of dynamically distributing service objects as now recited by claim 10 is not thought to be taught or reasonably suggested by Rao.

Regarding new dependent claims 12 and 13, Rao does not teach or reasonably suggest that a VR can span multiple processing elements as required. Rather, the individual VRs of Rao appear to be limited to using the resources of a single processing element. For at least this additional reason, dependent claims 12 and 13 are thought to be further distinguishable over the teachings of Rao.

Regarding new dependent claims 14 and 15, Rao does not teach or reasonably suggest defining a configured topology among a plurality of VRs as required by configuring VIs of the plurality of VRs to provide desired paths for packet flows and permissible transformations of the packet flows. For at least this additional reason,

dependent claims 14 and 15 are thought to be further distinguishable over the teachings of Rao.

Regarding new dependent claim 16, Rao does not teach or reasonably suggest a processing element may be shared by two VRs as recited. For at least this additional reason, dependent claim 16 is thought to be further distinguishable over the teachings of Rao.

Regarding new dependent claim 17, Rao does not teach or reasonably suggest a maintaining a replicated forwarding information base as recited. For at least this additional reason, dependent claim 17 is thought to be further distinguishable over the teachings of Rao.

Regarding new claims 18-22, they include limitations similar to those described with reference to new claims 10-17. Consequently, claims 18-22 are thought to be allowable over Rao for the same reasons presented with reference to new claims 10-17.

Claim Rejections – 35 U.S.C. §102
US Patent No. 6,463,061 of Rekhter

In the Office action, the Examiner rejected claims 1-9 under 35 U.S.C. §102(e) for allegedly being anticipated by US Patent No. 6,463,061 of Rekhter (hereafter “Rekhter”). The undersigned respectfully disagrees with the Examiner’s characterization of the teachings and/or applicability of Rekhter to the claims and points out distinctions between the claimed subject matter and the teachings of Rekhter.

As presently understood by the undersigned, Rekhter generally relates to providing routing for private wide-area networks using virtual routers. **Rekhter is not understood to address enhancements or improvements in relation to implementing customized managed network services.**

Regarding new independent claim 10, Rekhter does not teach or reasonably suggest the expressly required configuration of two different sets of customized services, including a plurality of firewalling, virtual private networking, encryption, traffic shaping, routing and NAT, within a VR-based switch for two different subscribers “by allocating a first service object group within the first plurality of VRs, the

first service object group including a service object corresponding to each service of the first set of customized services and wherein each service object of the first service object group can be dynamically distributed by the NOS to customized processors of the first set of one or more of the plurality of processing elements to achieve desired computational support” and “by allocating a second service object group within the second plurality of VRs, the second service object group including a service object corresponding to each service of the second set of customized services and wherein each service object of the second service object group can be dynamically distributed by the NOS to customized processors of the second set of one or more of the plurality of processing elements to achieve desired computational support.” For at least these reasons, independent claim 10 and its dependent claims, which add further limitations, are thought to be patentably distinguishable over Rekhter.

Regarding new dependent claims 12 and 13, Rekhter does not teach or reasonably suggest that a VR can span multiple processing elements as required. Rather, the individual VRs of Rekhter appear to be limited to using the resources of a single processing element. For at least this additional reason, dependent claims 12 and 13 are thought to be further distinguishable over the teachings of Rekhter.

Regarding new dependent claims 14 and 15, Rekhter does not teach or reasonably suggest defining a configured topology among a plurality of VRs as required by configuring VIs of the plurality of VRs to provide desired paths for packet flows and permissible transformations of the packet flows. For at least this additional reason, dependent claims 14 and 15 are thought to be further distinguishable over the teachings of Rekhter.

Regarding new dependent claim 16, Rekhter does not teach or reasonably suggest a processing element may be shared by two VRs as recited. For at least this additional reason, dependent claim 16 is thought to be further distinguishable over the teachings of Rekhter.

Regarding new dependent claim 17, Rekhter does not teach or reasonably suggest a maintaining a replicated forwarding information base as recited. For at least this additional reason, dependent claim 17 is thought to be further distinguishable over the teachings of Rekhter.

Regarding new claims 18-22, they include limitations similar to those described with reference to new claims 10-17. Consequently, claims 18-22 are thought to be allowable over Rekhter for the same reasons presented with reference to new claims 10-17.

Conclusion

Applicant respectfully submits that the amendments and remarks presented herein have overcome the rejections, and that the pending claims are in condition for allowance. Accordingly, Applicant requests that the rejections be withdrawn and that a Notice of Allowance be promptly issued for claims 10-22.

Request for a Telephone Interview

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at (303) 284-5103.

Respectfully submitted,

HAMILTON, DESANTIS & CHA

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